Amendment under Article 34 PCT received by IPEA on November 15, 2004

Claims

1. (Amended) A composite polymer electrode composition comprising a product produced by polymerizing *in situ* a monomer composition comprising (a) molten salt monomer having a polymerizable functional group and a quaternary ammonium salt structure consisting of a quaternary ammonium cation and a fluorine-containing anion, and (b) a lithium salt consisting of lithium ion and a fluorine-containing anion in the presence of an electrochemically inert polymer reinforcing material.

2. The composite polymer electrode composition of claim 1 wherein said monomer composition further comprizing a polyfunctional monomer copolymerizable with said molten salt monomer.

3. The composition of claim 1 wherein said quaternary ammonium cation is selected from the group consisting of 1-vinyl-3- alkylimidazolium cation, 4-vinyl-1-alkylpyridinium cation, 1-alkyl-3-allylimidazolium cation, 1-(4-vinylbenzyl-3-alkylimidazolium cation, 1-(vinyloxyethyl)-3-alkylimidazolium cation,

N-vinylimidazolium cation, 1-allylimidazolium cation, N-allylbenzimidazolium cation and quaternary diallyldialkylammonium cation, and wherein said fluorine-containing anion is selected from the group consisting of bis[(trifluoromethyl)sulfonyl]imide anion, 2,2,2-trifluoro-N-(trifluoromethylsulfonyl) acetamide anion, bis[(pentafluoroethyl)sulfonyl]imide anion, bis(fluorosulfonyl)imide anion, tetrafluoroborate anion and trifluoromethanesulfonate anion.

4. The composite polymer electrolyte composition of claim 1 wherein said polymer reinforcing material is selected from the group consisting of polytetrafluoroethylene, polyvinylidene fluoride, polyethylene, polypropyrene, polyacrylonitrile, polystyrene, polysulfone, polyether sulfone, polyetherketone, polyether ether ketone, polyetherimide, polyamideimide and polyimide.

5. The composite polymer electrolyte composition of claim 1 wherein said polymer reinforcing material is polyvinylidene fluoride or a modified polyvinylidene fluoride containing a plurality of carbon-to-carbon double bonds.

6. The composite polymer electrolyte composition of claim 1 wherein said polymer reinforcing material forms a polymer blend with the polymer of said molten

salt monomer.

7. The composite polymer electrolyte composition of claim 1 wherein said polymer reinforcing material is a porous sheet or film containing a large number of continuous pores, and wherein the polymer of said molten salt monomer forms a continuous phase through said pores.

8. The composite polymer electrolyte composition of claim 1 wherein said monomer composition is polymerized by heat.

9. The composite polymer electrolyte composition of claim 1 wherein said monomer composition is polymerized by irradiating with UV radiation.

10. The composite polymer electrolyte composition of claim 1 wherein said monomer composition is polymerized by irradiating with electron beam.

11. (Canceled)

12. (Amended) A composite polymer electrode composition of claim 1 wherein said charge transfer ion source is selected from the group consisting of $LiBF_4$, $LiPF_6$, $C_nF_{2n+1}CO_2Li$, $CnF_{2n+1}SO_3Li$, $(FSO_2)_2NLi$, $(CF_3SO_2)_2NLi$, $(C_2F_5SO_2)_2NLi$, $(CF_3SO_3)_3CLi$, $(CF_3SO_2\text{-}N\text{-}COCF_3)Li$ and $(RSO_2\text{-}N\text{-}SO_2CF_3)Li$, wherein n is an integer of 1-4 and R is an alkyl or aryl group.

13. A lithium ion battery comprising the composite polymer electrolyte composition of claim 12 sandwiched between an anode and a cathode.

14. (Canceled)

15. (Canceled)

16. (Canceled)

17. (Canceled)

18. (Canceled)